Shocks on the Romanian foreign exchange market before and after the global crisis

Ramona Dumitriu and Razvan Stefanescu

"Dunarea de Jos" University of Galati

3 June 2011

SHOCKS ON THE ROMANIAN FOREIGN EXCHANGE MARKET BEFORE AND AFTER THE GLOBAL CRISIS

DUMITRIU Ramona;
University "Dunarea de Jos" Galati;
rdumitriu@ugal.ro

STEFANESCU Razvan;
University "Dunarea de Jos" Galati;
rzvn_stefanescu@yahoo.com

Abstract
This paper explores some changes induced on the Romanian foreign exchange market by the global crisis. We study these changes from the perspective of number and intensity of the shocks occurred before and after the global crisis. We found some significant differences, explainable not only by the direct effects of the crisis, but also by the intervention of the National Bank of Romania.

Key words: *Romanian Foreign Exchange Market, Shocks, Global Crisis, Monetary Policy, National Bank of Romania.*

JEL classification: G15; G01; G14

1. Introduction

The shocks on a foreign exchange market could have various causes: macroeconomic policy measures, political events a.s.o. Such sharp changes have a significant impact on the international business and on the foreign investment (Griffin and Stulz; 2001).

The exchange rates regime applied in a country has a major influence on the foreign exchange market stability. In Romania, after the fall of the communist regime, the foreign exchange market was gradually liberalized. However, for a long period of time, the National Bank of Romania (NBR) maintained a substantial intervention in order to preserve the foreign exchange rates stability. In 2005 NBR officially adopted inflation targeting as its monetary strategy. This measure implied a relaxation of NBR intervention on the foreign exchange market. From 2008 the Romanian financial markets, including the foreign exchange market, were affected by the global crisis (Figure 1).

In this paper we study the changes induced by the global crisis on the Romanian foreign exchange from the perspective of number and intensity of the shocks occurred in this period of time. To our knowledge until now there were no attempts to analyze the shocks from the Romanian foreign exchange during the global crisis. We investigate such shocks using methods that are in general used to analyze the overreaction on the stock markets.

The plan of the paper is as it follows. In the next part we approach the relevant literature. The third part describes the data and the methodology used in our investigation. The fourth part presents the empirical results and the fifth part concludes.

2. Literature review

The subject of the shocks on the financial markets was approached in many scientific papers. De Bondt and Thaler (1985) analyzed the shocks from the stock markets in their study about the investors' overreaction to the major price changes. Such overreaction occurred especially when a shock caused the stock prices to move from their normal levels. The overreaction hypothesis was confirmed by the later researches (for example Howe, 1988; Atkins and Dyl, 1990; Bremer and Sweeney, 1991; Lasfer et al. 2003).

Clarida and Gali (1994) studied the macroeconomic shocks impact on the foreign exchange markets. Eichenbaum and Evans

(1995) found that monetary policy shocks are transferred on the exchange rates.

Eichengreen et al (2009) found a relevant influence of the monetary policy characteristics on the foreign exchange rates stability. Brenner and Sokoler (2009) studied the Israeli monetary policy and they concluded that inflation targeting should be applied in a free floating exchange regime.

Several studies found that financial crisis often induced significant changes in the exchange rate policy (for example Fama, 2005).

3. Theoretical Background

In our investigation we use daily values of RON/EUR exchange rates, provided by NBR. Our sample of data covers a time period from 3rd January 2005 to 21st April 2011. We compute the returns of the exchange rates using the equation:

$$R_t = \ln (S_t) - \ln (S_{t-1}) \qquad (1)$$

where:
- R_t is the return on the day t;
- S_t is the average exchange rate RON/EUR on the day t.

We split our sample of data in two sub-samples:
- first sub-sample, corresponding to a pre-crisis period, from 3rd February 2006 to 15th September 2008 (when it was announced the bankruptcy of Lehman Brothers);
- second sub-sample, corresponding to the crisis period, from 16th September 2008 to 21st April 2011.

We analyze the stationarity of the time series using the classical Augmented Dickey Fuller (ADF) test. We use a graphical representation to establish The deterministic component of this test will be chosen based on a graphical representation, while the number of lags will be chosen based on the Akaike Information Criterion.

We define the shocks on the foreign exchange market employing a methodology used by Lasfer et al (2003). Thus, we consider that a depreciation (positive) shock occurs in a day t when return exceeds, by two standard deviations, the average market daily return from a [-60; -10] time period (from the previous 60 trading days to the 10 days before the day t). An appreciation (negative) shock occurs in day t when the return lies two standard deviations below the average market daily return from [-60; -10] time period. The standard deviation is computed, as the average market daily return, over the [-60; -10] time period.

We separate the identified shocks in two categories: autonomous shocks and successive shocks. An autonomous shock is not preceded by any other shock in the 10 previous trading days. A successive shock occurs when the time period from the precedent shock is less than 10 trading days. We classify the successive shocks based on the nature of precedent shocks.

For each of the two samples we calculate the number and the average return of each category of shocks.

4. Empirical Results

Table 1 provides the descriptive statistics for the returns from the two periods of time. In the pre-crisis period of time the average return was negative but quite closed to zero. During the crisis, when for many months the national currency tended to depreciate, the average return was positive. The values of standard deviation for the two sub-samples, which reflect the volatility, are closed. The Augmented Dickey-Fuller tests indicate the stationarity of the two time series.

The identified depreciation shocks are presented in the Table 2. It resulted the number of depreciation shocks was much lower during the crisis than in the pre-crisis period of time. However, the successive depreciation shocks preceded by others depreciation shocks were more numerous in the second sub-sample comparing to the first one. The average return of the autonomous depreciation shocks was higher during the crisis in comparison with the pre-crisis period of time.

In the Table 3 there are presented the identified appreciation shocks. The average return of the autonomous appreciation shocks was lower during the crisis than

before. However, in the second sub-sample it was identified a higher number of successive appreciation shocks than in the first one.

5. Conclusions and implications

In this paper we identified the shocks on the Romanian foreign exchange market before and during the global crisis. For the two sub-samples with the same number of valid observations we found significant differences. It resulted that depreciation shocks were more numerous before than during the global crisis. Almost half of the depreciation shocks from the second sub-sample were preceded by appreciation shocks. During the crisis more appreciation shocks occurred than in the pre-crisis period.

Such differences could be explained by some circumstances of the global crisis and by some characteristics of NBR monetary policy. Since the beginning of the crisis the difficulties experienced by some countries from the Euro Area led to appreciations of the Romanian national currency against the euro. Despite the adoption of inflation targeting NBR intervention on the foreign exchange market is still very active. The decline of the depreciation shocks during the global crisis could be linked to NBR concern that a too consistent devaluation would stimulate the inflation. The large number of successive shocks is partially a consequence of NBR intervention.

The investigation about the shocks on the Romanian foreign exchange market could be extended to other foreign currencies. It should be also continued with the analysis of the shocks in the context of the global crisis future evolution.

References

1. Atkins, Allen B., and Edward, Dyl (1990) *Price Reversals, Bid-Ask Spreads, and Market Efficiency*, Journal of Financial and Quantitative Analysis 25, 535 - 547.

2. Benczur, P., Konya, I. (2004) *Real effects of nominal exchange rate shocks*, ESEM Working Papers, Budapest.

3. Bremer, Marc A. and Sweeney, Richard J. (1991) *The Reversal of Large Stock- Price Decreases*, Journal of Finance 46, 747-754.

4. Brenner, M., Sokoler, M. (2009) *Inflation Targeting and Exchange Rate Regimes: Evidence from the Financial Markets*, Review of Finance, 1–17.

5. Chang, R., Valesco, A. (2000) *Exchange Rate Policy for Developing Countries*, American Economic Review 90(2), Papers and Proceedings of the 112th Annual Meeting of the American Economic Association, May, 71-75.

6. Clarida, R., Gali, J. (1994) *Sources of Real Exchange Rate Fluctuations: How Important Are Nominal Shocks?*, Carnegie-Rochester Conference Series on Public Policy 41, 1-56.

7. DeBondt, Werner F. M., and Richard H. Thaler (1985) *Does the Stock Market Overreact?*, Journal of Finance 40, 793-805.

8. Eichenbaum, M., Evans, C. L. (1995) *Some Empirical Evidence on the Effects of Shocks to Monetary Policy on Exchange Rates*, The Quarterly Journal of Economics 110, 975-1009.

9. Eichengreen, B., Gullapalli, R. and Panizza, U. (2009) *Capital account liberalization, financial development and industry growth: a synthetic view*, Department of Public Policy and Public Choice – POLIS, Working paper n. 144.

10. Fane, G. (2005) *Post-Crisis Monetary and Exchange Rate Policies in Indonesia, Malaysia and Thailand*, Bulletin of Indonesian Economic Studies 41(2), 175-195.

11. Griffin, J.M. and Stulz, R.M. (2001) *International Competition and Exchange Rate Shocks: A Cross-Country Industry Analysis of Stock Returns*, Review of Financial Studies 14, 215 – 241.

12. Howe, John S (1986) *Evidence on Stock Market Overreaction*, Financial Analysts Journal 42, 74-77.

13. Krueger, A.O. (1983) *Exchange Rate Determination*, Cambridge University Press, Cambridge.

14. Lasfer, M. A., Melnik, A., Thomas, D. (2003) *Stock Price Reaction in Stressful Circumstances: An International Comparison*, Journal of Financial Economics 40.

15. Woo, W.T. (2000) *The Asian Financial Crisis: Hindsight, Insight, Foresight*, ASEAN Economic Bulletin 17, 113-119.

Appendix

Table 1 - Descriptive statistics for the RON/EUR returns from the two sub-samples

Indicator \ Sub-sample	3rd February 2006 – 15th September 2008	16th September 2008 – 21st April 2011
Mean	-0.0000004	0.000190823
Median	-0.000326433	-0.00007
Minimum	-0.0208098	-0.0254008
Maximum	0.0229753	0.0292724
Std. Dev.	0.00456710	0.00449190
Skewness	0.709426	0.277203
Ex. Kurtosis	3.11321	8.34037
Jarque-Bera test	324.333	1935.96
p- value for Jarque-Bera test	0.0001	0.00001
Augmented Dickey-Fuller test (1)	-3.07687	-2.64825
p- value for Augmented Dickey-Fuller test	0.02834	0.08334
Valid observations	665	665

Notes: (1) For both sub-samples it was chosen a constant as deterministic term;
(2) 53 lags for the first sub-sample and 48 lags for the second sub-sample

Table 2 - Depreciation (positive) shocks on the returns from the two sub-samples

Indicator \ Sub-sample	3rd February 2006 – 15th September 2008	16th September 2008 – 21st April 2011
Number of autonomous depreciation shocks	18	5
Average return of autonomous depreciation shocks	0.010778	0.011675
Number of successive depreciation shocks preceded by others depreciation shocks	15	7
Average return of successive depreciation shocks preceded by others depreciation shocks	0.010372	0.010044
Number of successive depreciation shocks preceded by appreciation shocks	3	11
Average return of successive depreciation shocks preceded by appreciation shocks	0.008789	0.008826
Number of all depreciation shocks	36	23
Average return of all depreciation shocks	0.010443	0.009816

Table 3 - Appreciation (negative) shocks on the returns from the two sub-samples

Indicator \ Sub-sample	3rd February 2006 – 15th September 2008	16th September 2008 – 21st April 2011
Number of autonomous appreciation shocks	9	8
Average return of autonomous appreciation	-0.010458163	-0.00787

shocks		
Number of successive appreciation shocks preceded by others appreciation shocks	7	13
Average return of successive appreciation shocks preceded by others appreciation shocks	-0.008563727	-0.00852
Number of successive appreciation shocks preceded by depreciation shocks	6	12
Average return of successive appreciation shocks preceded by depreciation shocks	-0.007792568	-0.01147
Number of all appreciation shocks	22	33
Average return of all appreciation shocks	-0.009128407	-0.00943

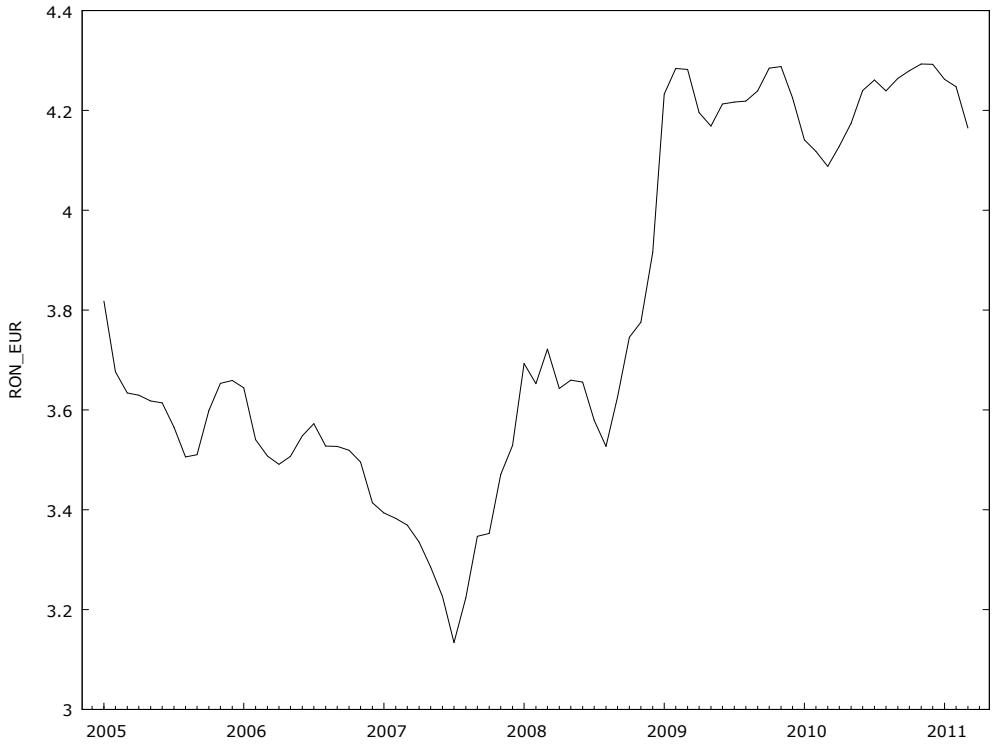

Figure 1 - Evolution of the monthly RON/EUR exchange rates from January 2005 to March 2011